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10/727,510	12/05/2003	Kazuhisa Fukushima	032094	7859

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EXAMINER

GOLDBERG, JEANINE ANNE

ART UNIT	PAPER NUMBER
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1634

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11/06/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/727,510

Applicant(s)

FUKUSHIMA ET AL.

Examiner

Jeanine A. Goldberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-5 and 7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-5 and 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This action is in response to the papers filed August 31, 2007. Currently, claims 2-5, 7 are pending.
2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 31, 2007 has been entered.
3. All arguments have been thoroughly reviewed.
4. Any objections and rejections not reiterated below are hereby withdrawn.

### ***Election/Restrictions***

5. Applicant's election without traverse of Group 1, Claims 1-5 in the paper filed January 3, 2006 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL.

***Priority***

6. This application claims priority to Japanese Appln No. 2002-353559, filed December 5, 2002.

It is noted that a translation of the foreign document has not been received.

***Drawings***

7. The drawings are acceptable.

***New Matter***

8. Claims 2-5, 7 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the amended claims, reference to "beads-ID recognizing address linkers are specific to each of said beads" are included. The amendment proposes that the new claim language is supported on page 3, lines 23-25. However, the specification does not describe or discuss "beads-ID recognizing address linkers are specific to each of said beads". Instead the specification states "address linker 3 (address-judging antigen or address-judging antibody) for recognizing specific beads number ID is fixed on the surface of beads 1. As seen in Figure 2, all of the addressing probe proteins are illustrated identically. This description does not support beads-ID recognizing address

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linkers are specific to each of said beads. There is no discussion of specificity for the linkers. The concept of "beads-ID recognizing address linkers are specific to each of said beads" does not appear to be part of the originally filed invention. Therefore, "beads-ID recognizing address linkers are specific to each of said beads" constitutes new matter. Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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10. Claims 2, 4, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balasubramanian et al. (WO 00/06770, February 10, 2000) in view of Chee et al. (US 6,858,394, February 22, 2005).

Balasubramanian teaches arrayed biomolecules and their use in sequencing. Balasubramanian teaches a method of using an array which has a surface density which allow molecules to be individually resolved by optical microscopy. The method uses arrays which may be formed by simply immobilizing a mixture of molecules to a solid surface in such a way that provides sufficient separation between the molecules to allow each molecule to be resolved optically. The molecule is immobilized at one or more points by specific interaction with the surface (page 2, lines 29-32).

Balasubramanian teaches that the arrayed molecules may be immobilized on a solid support via micorspheres (page 3, lines 15-17). Balasubramanian teaches that the micorspheres are functionalized polystyrene latex microsphere (page 15)(limitations of Claim 4). Balasubramanian teaches that many thousands of reactions can be detected at the same time with no phasing problems (page 3, lines 32). The array of polynucleotides are contacted with a plurality of detectably-labeled fragments of an organism's genomic DNA under hybridizing conditions and detecting hybridization (page 4, lines 13-16). As seen in Figure 2, the immobilization of a polynucleotide to a solid surface via a microsphere is illustrated. Balasubramanian teaches that the arrays may comprise protein molecules immobilized on a solid surface, the protein molecules being conjugated with or otherwise bound to a short polynucleotide molecule may be interrogated, to address the array (page 6, lines 14-16). Balasubramanian teaches that

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the surface of the solid support may be coated with streptavidin or avidin and then a dilute solution of a biotinylated molecule is added at discrete sites on the surface (page 8, lines 1-4). If the molecule is a polynucleotide then immobilization may be via hybridization to a complementary nucleic acid molecule previously attached to a solid support (page 8). Balasubramanian teaches that the target molecules are immobilized onto the microspheres and the microspheres are immobilized in turn to a solid support to fix the target sample for microscope analysis (page 8). Thus, Balasubramanian teaches immobilizing primers on beads, contacting the beads with samples under hybridizing conditions to allow "self-sort" onto the bead. The beads are then in turn immobilized onto a solid support, array (page 8). Much like the schematic filed in the after-final amendment of 2/27/07, Figure 2 illustrates a protein interaction on the solid surface which immobilizes a bead with nucleic acid molecules which have been hybridized with sample and labels. Balasubramanian teaches that "spatially addressable" is used to describe how different molecules may be identified on the basis of their position on an array (page 10, lines 15-20). Balasubramanian teaches that short sequences that a protein binds to may be used to find all the transcription-controlling proteins or cDNA (page 13)(limitations of Claim 5).

While Balasubramanian specifically teaches spatially addressing to determine and identify different molecules on the basis of their position on an array, Balasubramanian does not specifically teach spatially addressing the beads by an antigen-antibody reaction.

However, Chee teaches composite arrays using microspheres and methods for decoding microsphere array sensors. Chee teaches a method of decoding an array composition comprising providing an array composition and adding a plurality of decoding binding ligands to the composite array composition to identify the location of at least a plurality of the bioactive agents. Chee illustrates the addressability of specific substrates using analyte binding on a second substrate (see Figure 1F). Figure 1 F depicts the use of binding functionalities to "target" first substrates to locations on the second substrate (col. 2, lines 65-67). Chee teaches that biologically modified sties may be used to attach beads to the substrate. For example one partner is on the bead and the other is on the substrate. Particularly preferred in this embodiment are complementary nucleic acid strands and antigen/antibody pairs (col. 8, lines 45-50). Chee teaches that by using different populations with different binding partners, and a substrate comprising different array locations with spatially separated binding partners, a composite array can be generated (col. 8, lines 59-61). The binding moieties may be used simply for attachment or for targeting the first substrate arrays to particular locations in or on the second substrate.

Chee teaches that the beads or microspheres may be plastics, ceramics, glass, polystyrene, methylstyrene, paramagnetic materials, for example (col. 9, lines 24-26)(limitations of Claim 4).

Chee teaches the target sequence may be a portion of a gene, a regulatory sequence, genomic DNA, cDNA, RNA (col. 13, lines 20-30)(limitations of Claim 5).



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Therefore, it would have been prima facie obvious at the time the invention was made to have modified the protein interaction of Balasubramanian with the specific antibody/antigen interaction taught by Chee. Chee teaches that by using different populations with different binding partners, and a substrate comprising different array locations with spatially separated binding partners, a composite array can be generated. The antibody/antigen interaction is a simple detection means. Both Chee further teaches exemplary binding pairs are antibody/antigen pairs. The ordinary artisan would have been motivated to have modified the protein interactions of Balasubramanian with the more simple and highly specific binding pairs of Chee, namely antigen/antibody pairs. The ordinary artisan would have sorted and addressed the different populations of beads created by Balasubramanian using the methods of Chee to obtain specific sorting based upon interactions to identify the presence of analytes in a sample.

### **Response to Arguments**

The response traverses the rejection. The response asserts that Balasubramanian addressing the array is not done by an interaction between the microsphere and the substrate. This argument has been considered but is not convincing because the interaction between streptavidin/biotin is the attachment means taught in Balasubramanian.

The response asserts that the reaction of streptavidin/biotin is non-specific. This argument has been reviewed and is not persuasive in view of the teachings of Chee such that specific antibody/antigen interactions address the beads of Chee. Thus for the reasons above and those already of record, the rejection is maintained.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Balasubramanian et al. (WO 00/06770, February 10, 2000) in view of Chee et al. (US 6,858,394, February 22, 2005) as applied to Claims 2, 4, 5, 7 above and further in view of Collier et al. (US Pat. 5,985,548, November 1999).

Neither Balasubramanian nor Chee specifically teach a method of stirring beads.

However, Collier teaches beads and test mixtures are agitated to assure contact with the bead supports (see Example 2).

Therefore, it would have been prima facie obvious to the ordinary artisan at the time the invention was made to have added an agitation or stirring step to the bead method of Balasubramanian in view of Chee for the expected benefits taught by Collier. Collier specifically teaches the ordinary artisan would be motivated to agitate bead and test mixtures to assure contact with the bead supports. Thus, in order to ensure contact of the beads and mixtures, the ordinary artisan would have included an agitation step.

### **Response to Arguments**

The response traverses the rejection. The response asserts that the claims are patentable at least due to its dependency on claim 7. This argument has been considered but is not convincing for the reasons presented above. Thus for the reasons above and those already of record, the rejection is maintained.

### ***Conclusion***

12. **No claims allowable over the art.**

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Jeanine Goldberg whose telephone number is (571) 272-0743. The examiner can normally be reached Monday-Friday from 7:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla, can be reached on (571) 272-0735.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

The Central Fax Number for official correspondence is (571) 273-8300.



**Jeanine Goldberg**

**Primary Examiner**

November 2, 2007